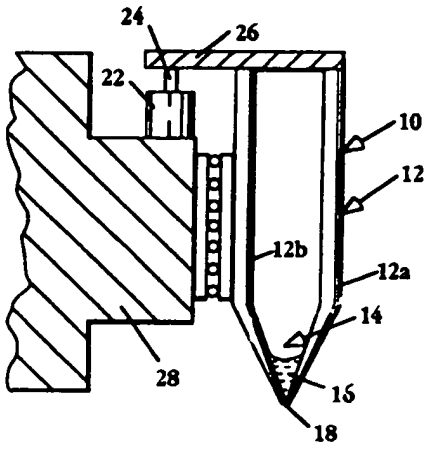


Fig. 1
(Prior Art)

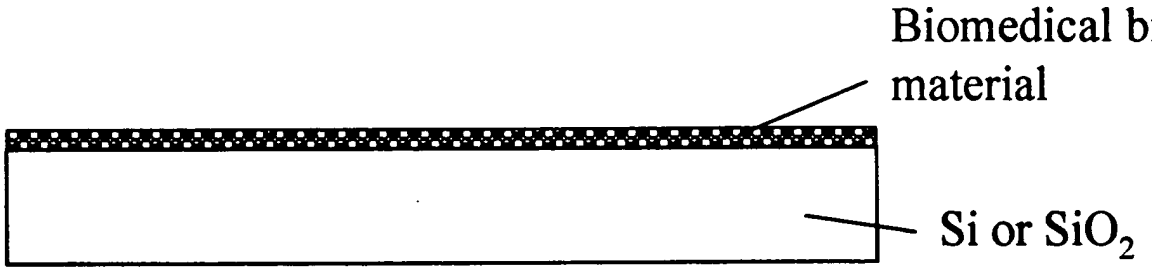


Fig. 2A-1 (Prior Art)

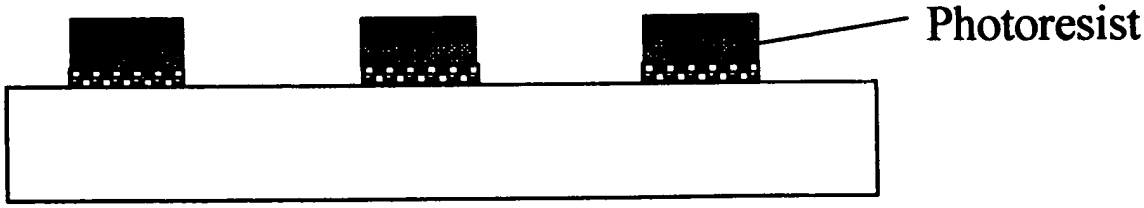


Fig. 2A-2 (Prior Art)

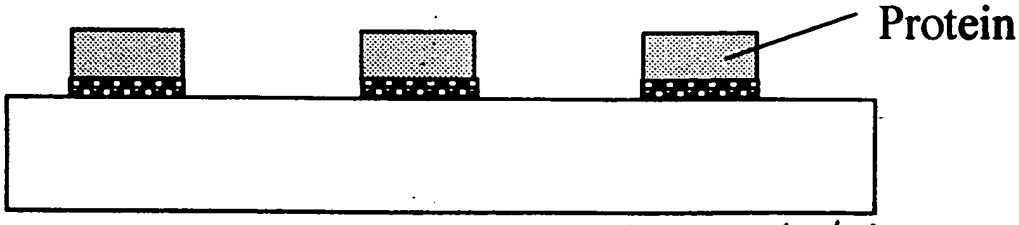


Fig. 2A-3 (Prior Art)

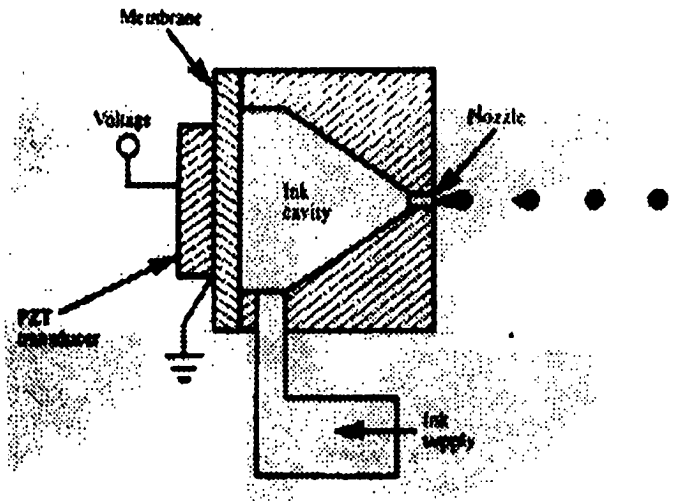


Fig. 2B-1 (prior Art)

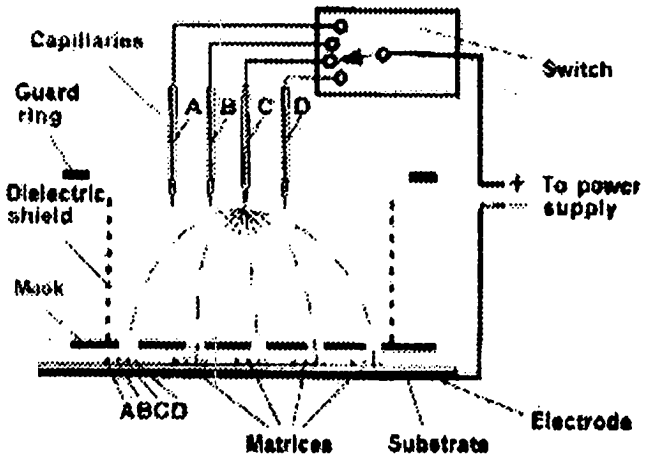


Fig. 2B-3 (prior Art)

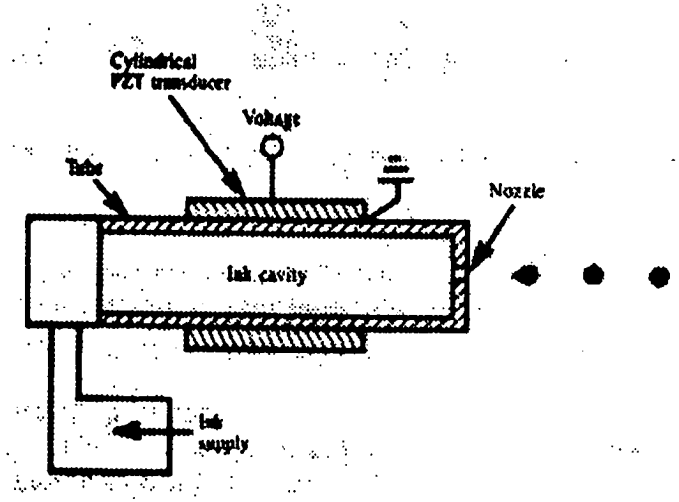


Fig. 2B-2 (prior Art)

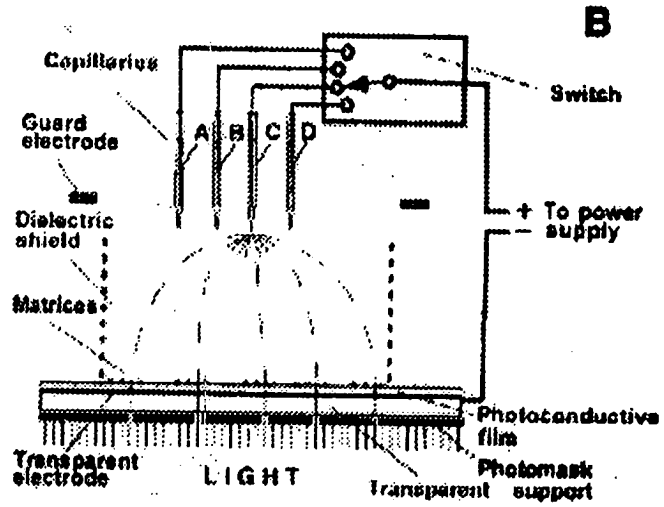


Fig. 2B-4 (prior Art)

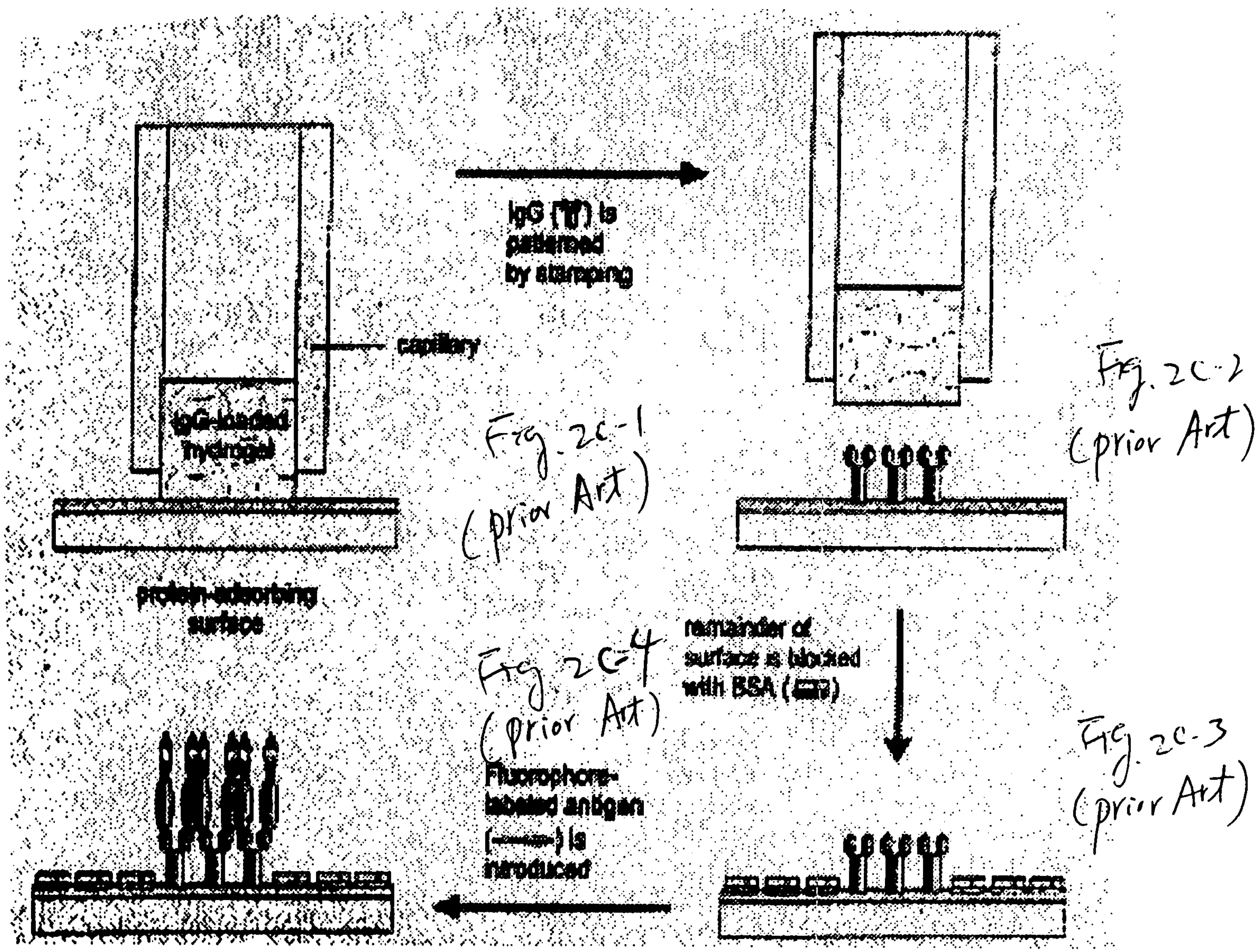


Fig. 2C-1 (prior Art)

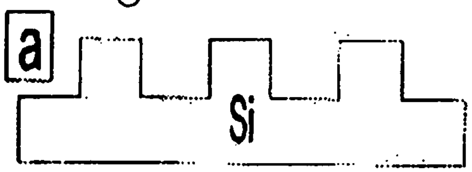
Fig. 2C-2 (prior Art)

Fig. 2C-3 (prior Art)

Fig. 2C-4 (prior Art)

One type protein

Fig. 2D-a (prior Art)



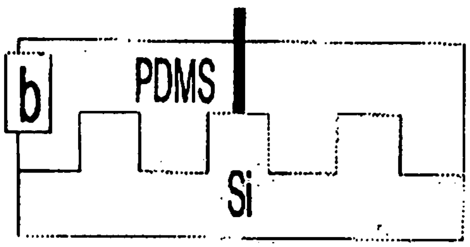


Fig. 2D-b (prior Art)

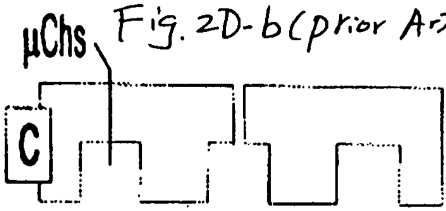


Fig. 2D-c (prior Art)

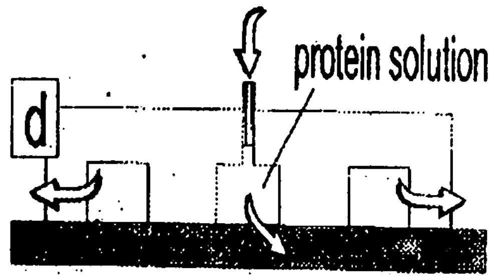


Fig. 2D-d (prior Art)

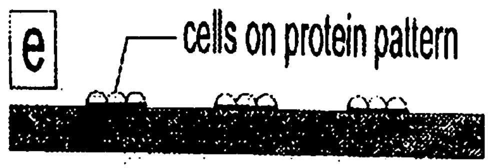


Fig. 2D-e (prior Art)

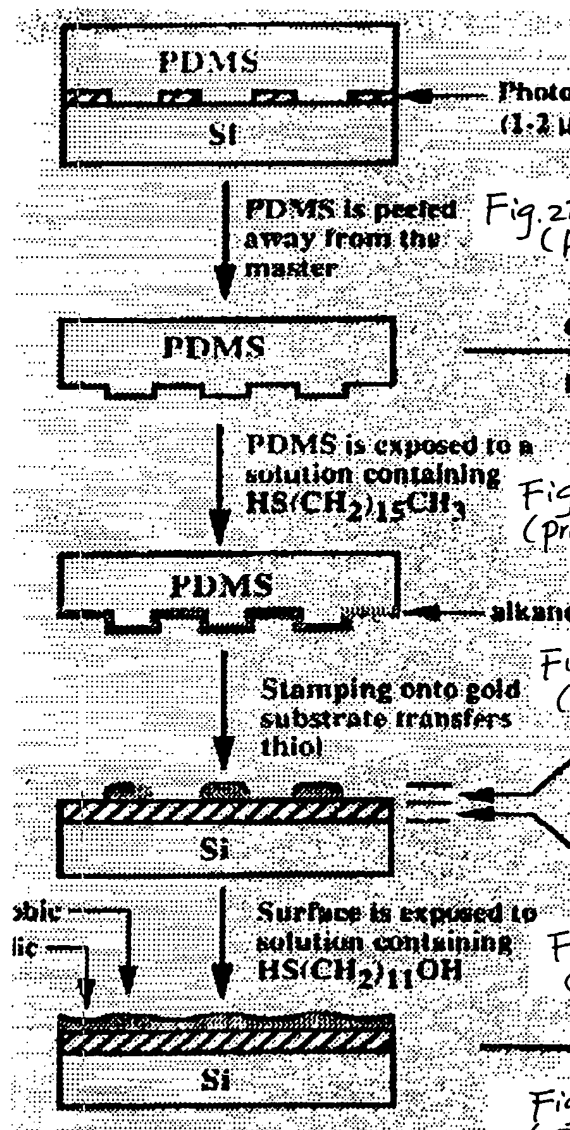


Fig. 2E-1 (prior Art)

Fig. 2E-2 (prior Art)

Fig. 2E-3 (prior Art)

Fig. 2E-4 (prior Art)

Fig. 2E-5 (Prior Art)

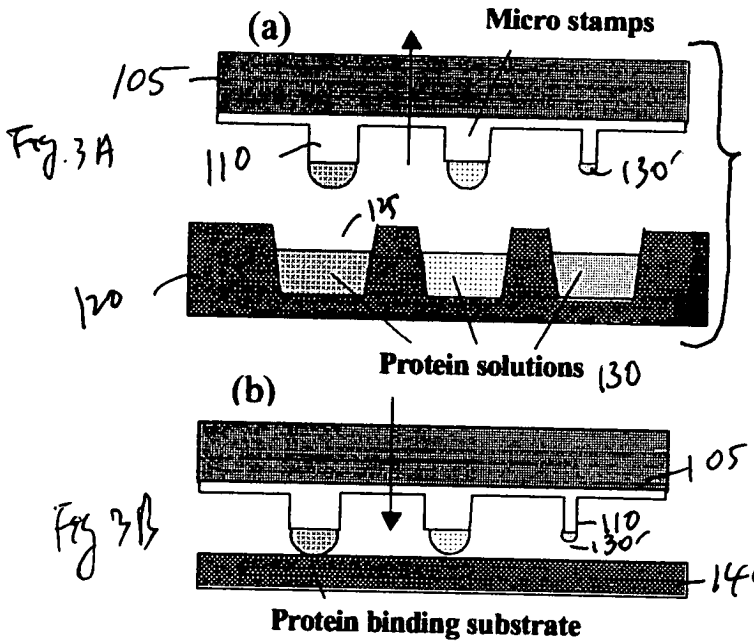


Fig. 3A

Fig 3B

Fig. 3C

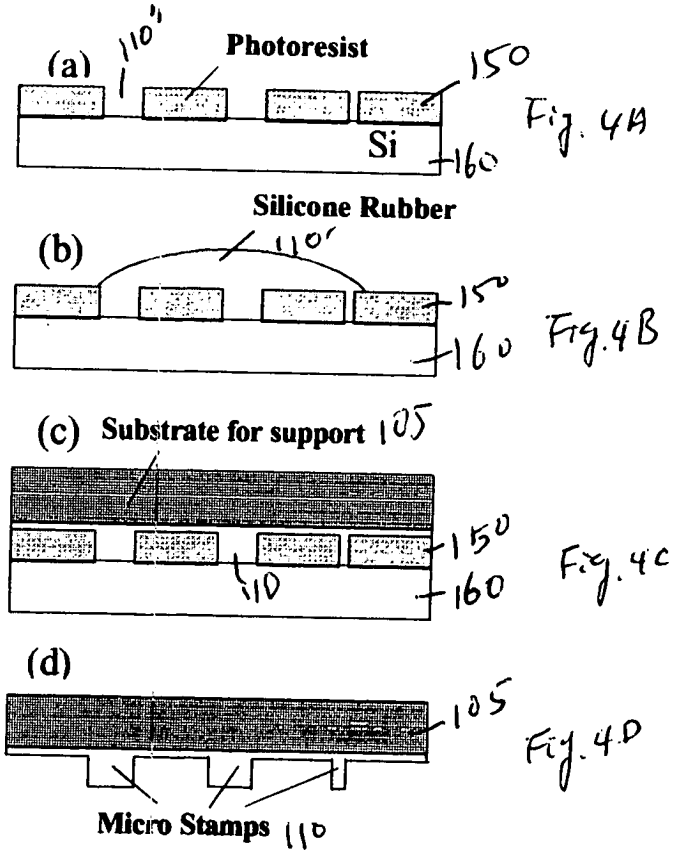


Fig. 4A

Fig. 4B

Fig. 4C

Fig. 4D

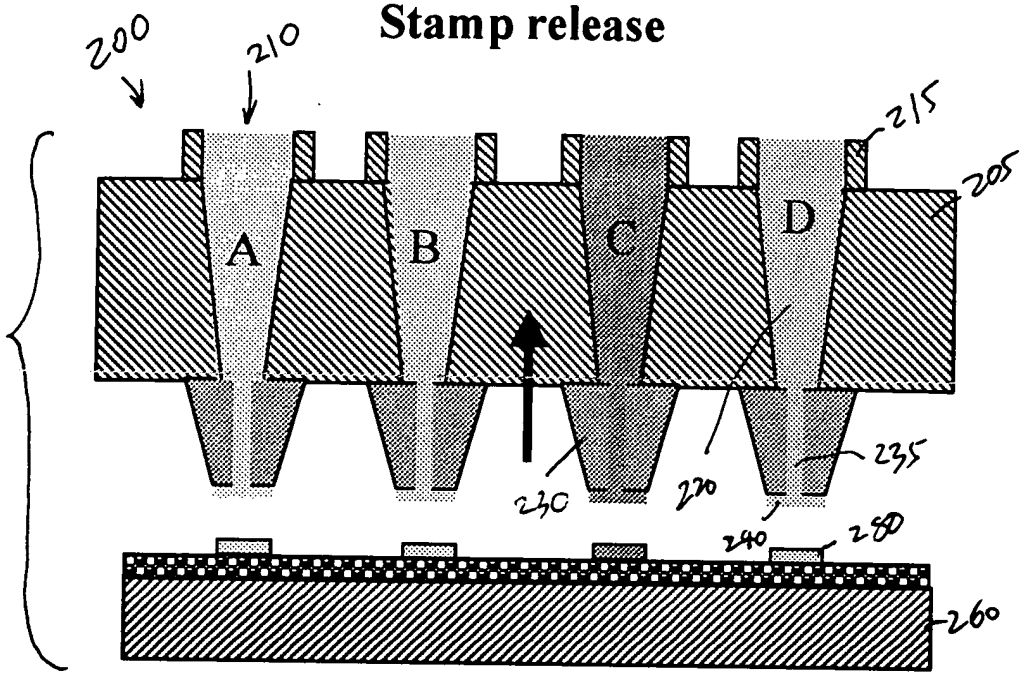


Fig. 5

Plating needle connector

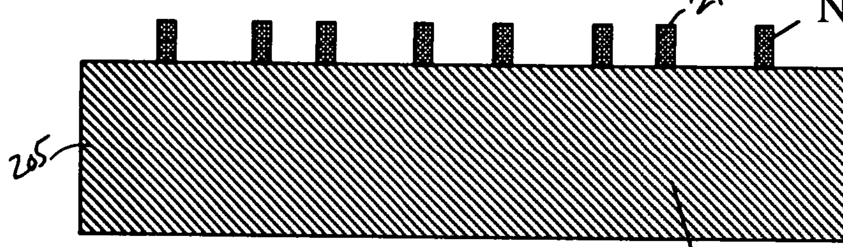


Fig. 6A

Molding Silicone rubber Stamp

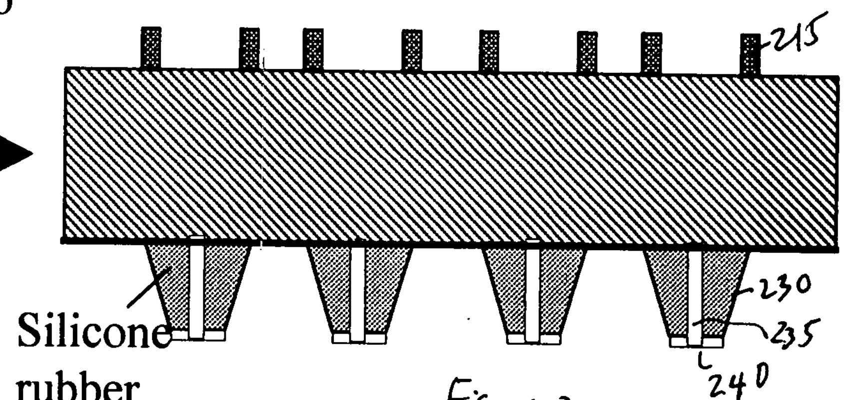


Fig. 6B

Deep RIE/wet etching fluid channel

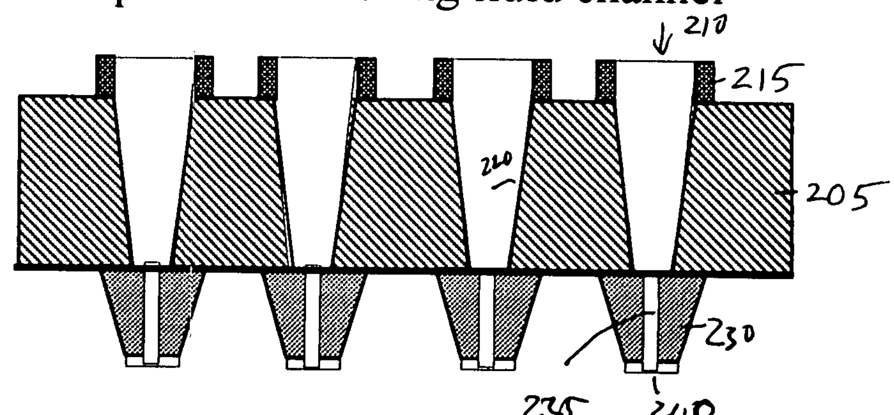


Fig. 6C

Remove silicone rubber residue to open channel/stamp connection

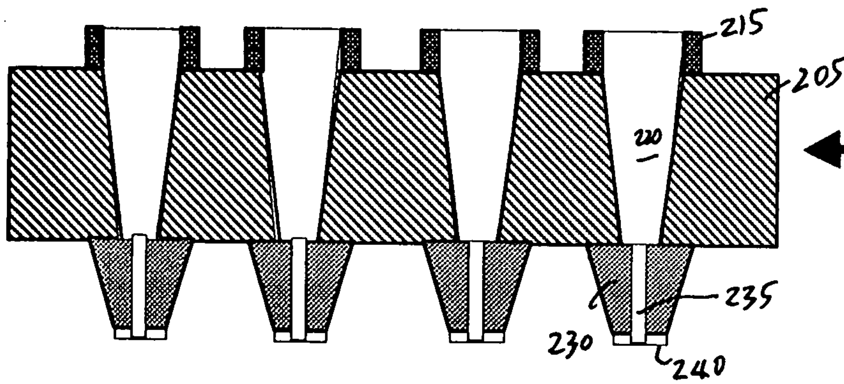


Fig. 6D

Wet etching Glass substrate
To make primary and micro channel

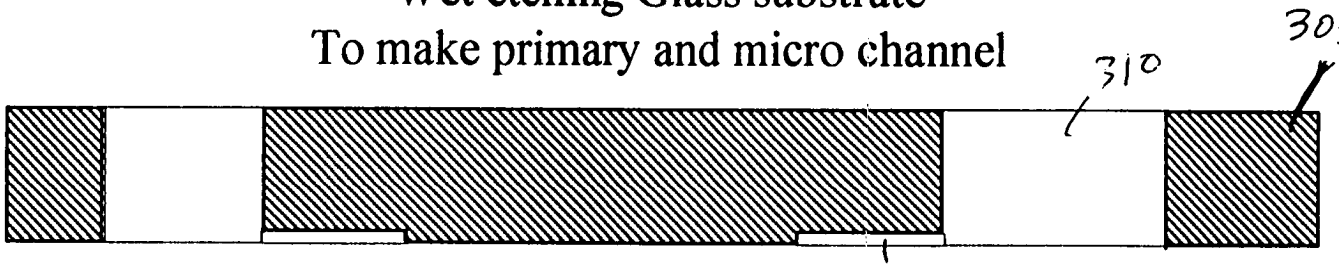


Fig. 7A

Silicone rubber molding silicon substrate
Deep RIE secondary reservoir

Fig. 7B

Wafer bonding

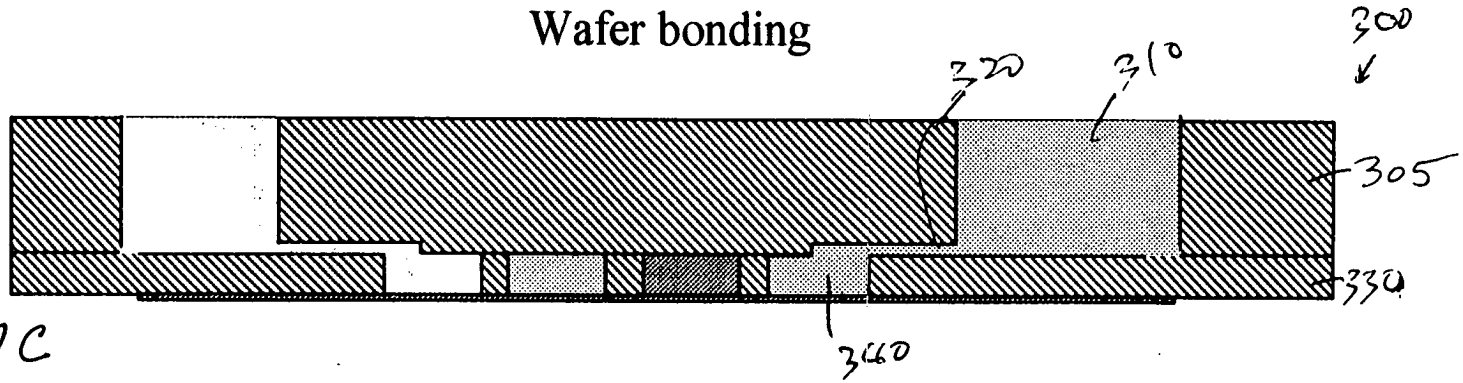


Fig. 7C

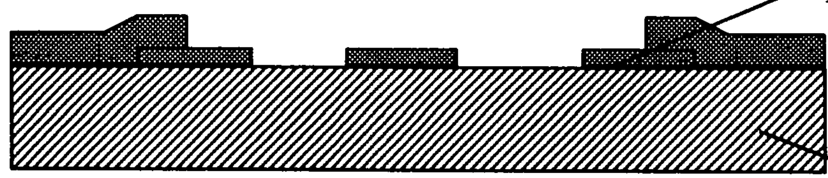

Electrode, sensor, heater 310
Si, SiO_2
305

Fig. 8A

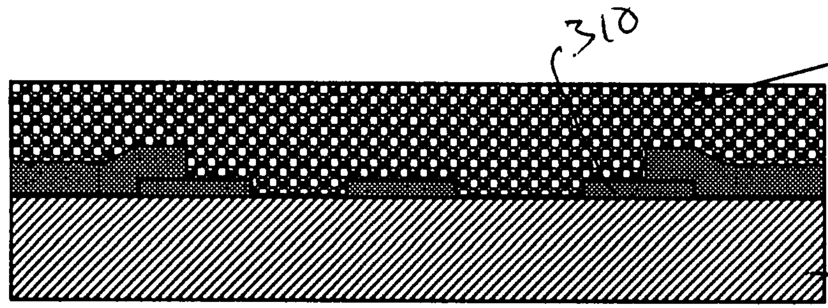
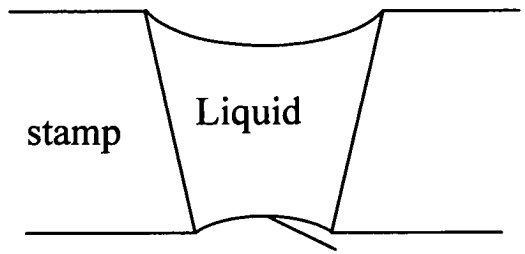

310
Bio bindable material
(SiO_2, PVDF, Nilon..)
Or Bio gel. 320
305

Fig. 8B

New design concepts

A. Liquid filling into stamp

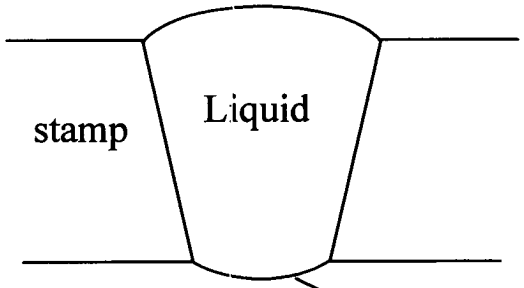
(1) hydrophilic surface inside channel (easy to fill in, but the bottom meniscus of liquid is concave upward which is not desired)



Not easy to contact with reaction substrate

Fig 9A

(2) hydrophobic surface inside channel (liquid hard to fill in, however, the bottom meniscus of liquid is what we need; concave downward)



Easy to contact with reaction substrate

Fig 9B

(3) hybrid surface inside channel

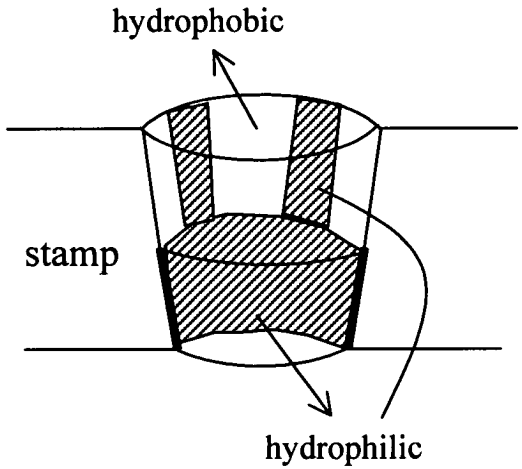


Fig. 9C

partial hydrophilic and hydrophobic surface as the left side; or the surface can be switched into hydrophilic or hydrophobic as desired

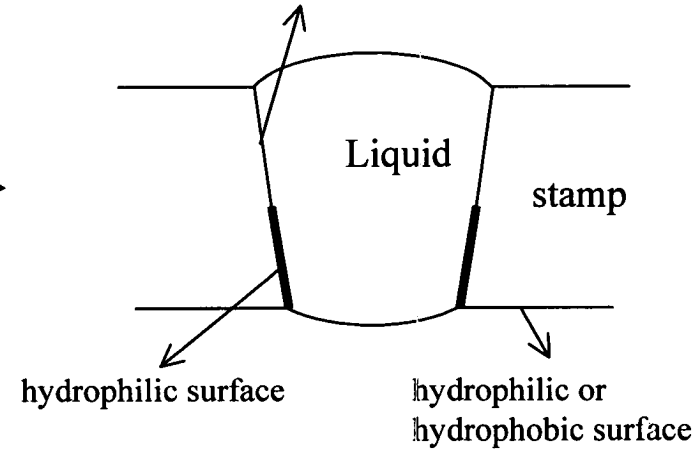


Fig. 9D

New idea: 2 D micro Separation

(a) Blood or bio-reagent mixture drop

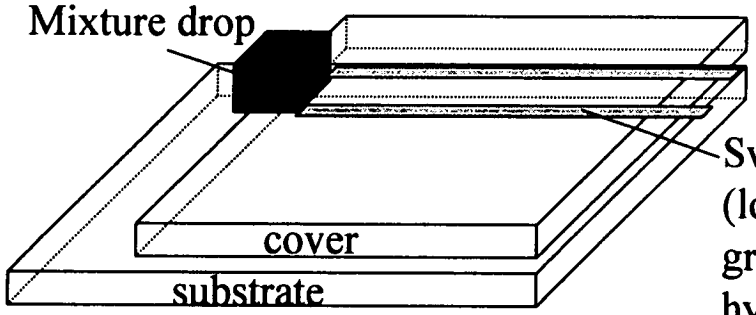


Fig 10A

(b) Liquid mixture fill in by surface tension

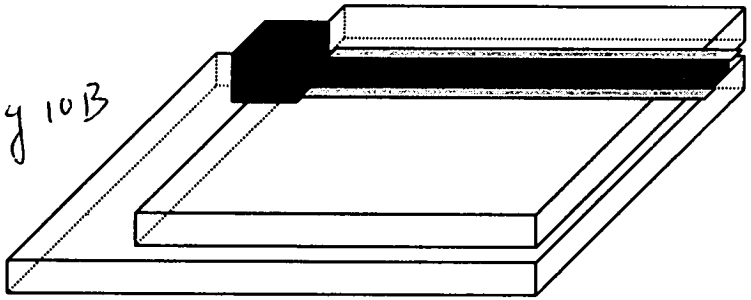


Fig 10B

(c) Proteins, DNA, or bio-reagent focus

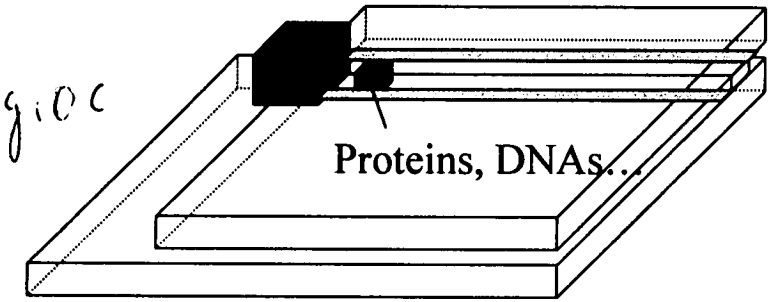


Fig 10C

(d) Proteins, DNA... coarse separation by capillary electrophoresis

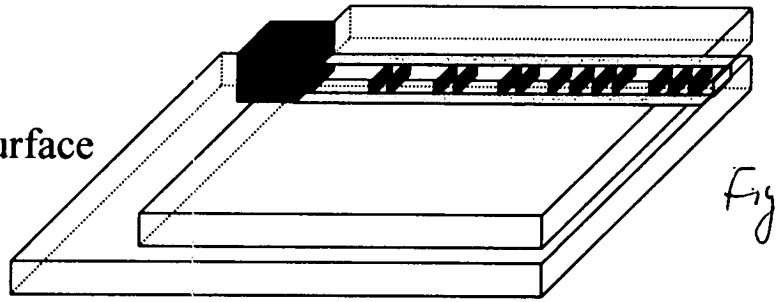


Fig 10D

(e) Mixture droplet separation

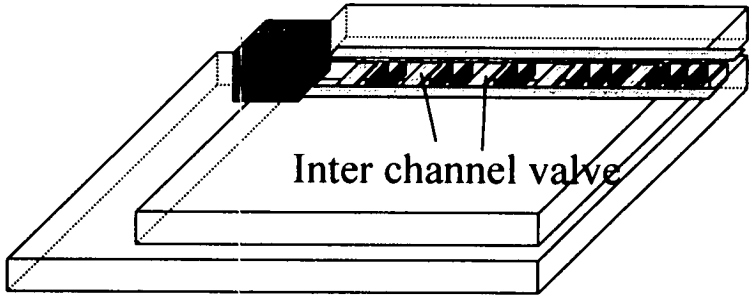


Fig 10E

(f) Liquid fill into vertical channels and Fine separation by capillary electrophoresis

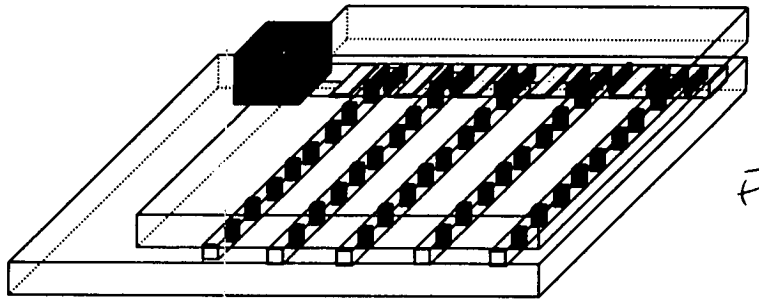


Fig 10F

(a). Dry off and take out the cover

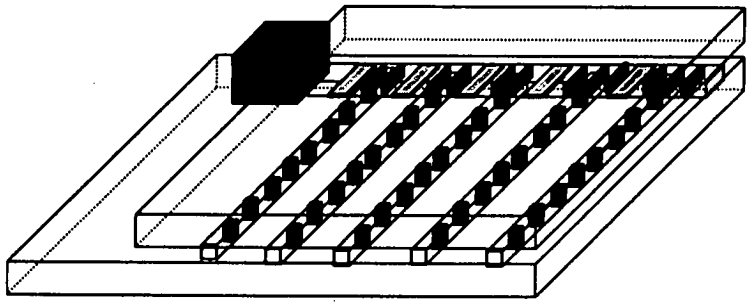


Fig 11 A

Micro protein arrays on chip surface

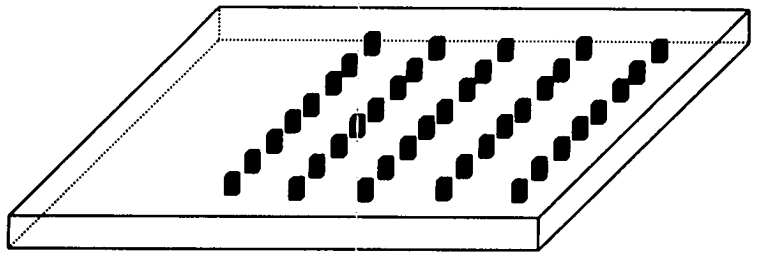
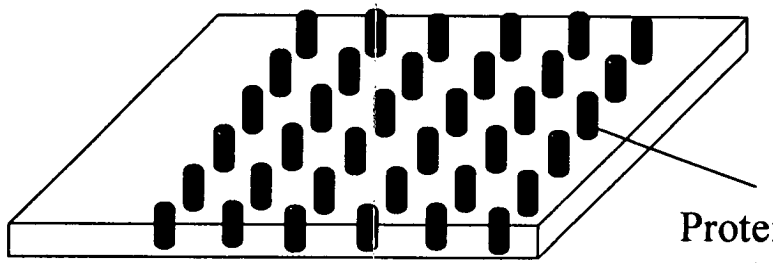


Fig 11 B

For direct analysis

(b). Suck into micro chambers

Micro protein arrays inside micro chambers



Proteins inside small chambers

Directly connected to micro stamp for microfilling process (pitch is exactly the same as on the stamp)

Fig 11 C.